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FARMER AND McCREADY

Mortality Reductions in Ontario
N. E. McKINNON

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TORONTO
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A Tuberculosis Survey among Ottawa Federal Civil Servants

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IN 1943 arrangements were made between the Federal Government and the Ontario Department of Health for a tuberculosis survey of the Ottawa Federal Civil Servants. The survey, which lasted from September 20, 1943, to March 31, 1944, was done by the Division of Tuberculosis Prevention. A photoroentgen unit, equipped for the taking of 4″ x 5″ films, was used and the technical staff consisted of three technicians. The details of arranging for the X-ray of the employees in the many departments involved were efficiently carried out by a secretarial staff supplied by the Department of Pensions and National Health under the supervision of Dr. H. T. Douglas, Chief of the Medical Inspection Board, and his liaison officer, Mr. G. Heidman.

The films were sent to the Division of Tuberculosis Prevention, Toronto, where they were developed and interpreted by the clinical staff. Those individuals whose films showed significant or suspicious shadowing were recalled for 14″ x 17″ films in order to permit a more detailed study. Every second week a physician of the Division of Tuberculosis Prevention went to Ottawa to interview and examine those persons who the week previously had been re-rayed with the larger films. A history was taken and examination consisted of weight, temperature reading, blood sedimentation test, tuberculin test in most instances, sputum and chest examinations. Significant cases were then reviewed either with Dr. D. A. Carmichael or Dr. E. J. Lehman of the Royal Ottawa Sanatorium, if they were residents of Ottawa, or with Dr. Arthur Powers of the St. Laurent Sanatorium, Hull, if they were resi-

Presented before the Section of Epidemiology at the thirty-third annual meeting of the Canadian Public Health Association, held in Toronto, November 6-8, 1944.

dents of the Province of Quebec. In addition, the members of the clinical staff of the Division of Tuberculosis Prevention also reviewed each case.

The standard classification in this survey for active pulmonary tuberculosis was, along with radiological evidence, tubercle bacilli in the sputum either on direct smear or on culture and other clinical findings such as pyrexia, increased blood sedimentation rate, symptoms referable to the lungs and physical signs.

Method of Reporting Cases

A copy of each case report was sent to the following:

1. The Department of Pensions and National Health.
2. The private physician, if there was one.
3. The local medical officer of health, in the case of persons found to have tuberculosis.
4. The particular chest clinic designated for follow-up, either in Ottawa or Hull.
5. The individual, but only following an interview, except in certain cases where the condition was not thought to be significant and where no apprehension would be caused, in which case the report was sent direct without interview. When active disease was discovered, each private physician was personally informed of the situation by telephone.

A copy was also placed in the files of the Division of Tuberculosis Prevention.

The number of Federal Civil Servants, including employees of the Inspection Board of the United Kingdom and Canada, working in Ottawa on September 30, 1943, was 33,695. Of these, 30,260 or 89.8 per cent were given an X-ray of the lungs and 731 or 2.4 per cent were recalled for 14″ x 17″ films. This is a higher percentage of retakes than usual, as special care was taken not to overlook any possible abnormal condition.

The total number of cases of tuberculosis reported was 607 or 2.0 per cent (Table I). Of these, 120 or 0.39 per cent were shown to have active disease, 118 cases being pulmonary and two extra-pulmonary. Eighty-eight were newly discovered cases and there were thirty-two previously known cases considered inactive prior to the survey which were found to have become reactivated.

TABLE I

General Summary

1. Total number of Civil Servants X-rayed (4″ x 5″ films)				30,260
2. Number of persons re-rayed with 14″ x 17″ films			731	2.4%
3. Number with no abnormality of lungs, heart or thoracic cage			28,900	95.5%
4. Number with tuberculosis—all types (inactive and active)			607	2.0%
5. Number with pulmonary tuberculosis			602	1.98%
(*a*) Active	118	0.389%		
(*b*) Activity questionable	81	0.26 %		
(*c*) Inactive	403	1.33 %		
6. Number with extra-pulmonary tuberculosis			5	0.02%
(*a*) Active (cervical adenitis)	2			
(*b*) Inactive (spine and hip)	3			
7. Total number with *active* tuberculosis			120	0.39%
8. Number with evidence of healed primary infection			140	0.46%

9. Number with evidence of recent pleurisy with effusion	3	0.01%
10. Number with evidence of previous healed pleurisy	274	0.90%
11. Number with other abnormal thoracic conditions	294	0.97%
12. Number classified as pulmonary tuberculosis suspects requiring further observation	42	0.13%

CLASSIFICATION OF PULMONARY TUBERCULOSIS CASES

	Active	Activity Questionable	Inactive	Totals
Minimal	48	59	306	413
Moderately advanced	49	20	92	161
Far advanced	21	2	5	28
Totals	118	81	403	602

In order to make the survey as comprehensive as possible, ten cases of active tuberculosis, reported by outside agencies during the period in which the survey was conducted, have been included.

The classification of cases of active pulmonary tuberculosis (Table II) is of interest in that 40.6 per cent of the active cases were in the minimal stage. Of the total admissions to sanatoria in Ontario in 1943 only 21 per cent were classified as minimal, and a comparison of these figures proves the great value of early diagnosis by means of mass X-ray surveys.

TABLE II

CLASSIFICATION OF CASES OF ACTIVE PULMONARY TUBERCULOSIS

Total number of cases with pulmonary tuberculosis	602
Total number reported as active	118 — 19.6%
(Percentage in relation to total pulmonary tuberculosis cases.)	

PERCENTAGE OF CLASSIFICATIONS OF ACTIVE CASES IN RELATION TO TOTAL NUMBER OF ACTIVE CASES

Minimal	48 — 40.6%
Moderately advanced	49 — 41.5%
Far advanced	21 — 17.8%

ACTIVE CASES ACCORDING TO SEX

Females	69 — 58.4%
Males	49 — 41.6%

The history and clinical findings in eighty newly discovered active cases were analysed (Table III). Thirty-two per cent had no definite symptoms and in others it was only after close questioning that a history of cough, loss of weight, or fatigue could be elicited. The patients attributed these symptoms in many instances to a simple cold or being "run-down". The physical examination of the lungs yielded negative results in 66 per cent. Only 10 per cent considered their complaints of sufficient importance to consult a physician. The insidious onset of the disease and the paucity of significant symptoms and physical findings again emphasize the fact that an X-ray of the lungs is the only certain diagnostic method in the early diagnosis of a very considerable percentage of cases of active pulmonary tuberculosis.

TABLE III

HISTORY AND CLINICAL FINDINGS OF EIGHTY NEWLY DISCOVERED ACTIVE CASES OF PULMONARY TUBERCULOSIS

History and Symptoms:	
Number with no definite symptoms	26 — 32.5%
Cough	23 — 28.7%
Loss of weight	31 — 38.7%
Fatigue	23 — 28.7%
Hæmoptysis	3 — 3.7%
Contact with tuberculosis	23 — 28.7%
History of previous pleurisy	18 — 22.5%
Previously consulted a physician with reference to above complaints	8 — 10.0%
Previously attended a chest clinic on account of contact	3 — 3.7%
Examination:	
Pyrexia	18 — 13.3%
Increased blood sedimentation rate	30 — 37.5%
Significant lung findings	27 — 33.7%
Positive sputum	39 — 48.7%

Of the 118 cases of active pulmonary tuberculosis (Table IV) 96 or 81.4 per cent submitted sputum for examination. Sixty-six (56 per cent of the total or 68.7 per cent of those submitting sputum) showed the presence of tubercle bacilli either on direct smear or culture. All specimens for direct smear were concentrated, two sputum bottles being given for concentration and one for culture.

TABLE IV

ANALYSIS OF SPUTUM EXAMINATIONS

Total number of cases of active pulmonary tuberculosis		118
1. Not submitted due to lack of sputum or neglect to return specimens	22 — 18.6%	
2. Number of cases submitting sputum	96 — 81.4%	
3. Positive:		
(*a*) Direct smear	49	
(*b*) Culture	17	
Total	66	56% of active cases; 68.7% of those submitting sputum
4. Negative either on direct smear or culture	30 — 31.3% of those submitting sputum	

DISPOSITION OF ACTIVE CASES

Because of a marked shortage of beds at the Royal Ottawa Sanatorium, the disposition of active cases (Table V) in need of sanatorium treatment was a serious problem. The Division of Tuberculosis Prevention undertook to place in other Ontario sanatoria as many as would consent to go. The co-operation of the superintendents of these institutions was most helpful. Thirty-eight cases were thus disposed of in addition to twenty-nine admitted to the Royal Ottawa Sanatorium and four admitted to the St. Laurent Sanatorium, Hull, Quebec.

Twelve who were residents of Ottawa and district for less than one year returned to their home provinces for treatment, which was arranged for or promised by the health authorities before leaving Ontario. Six of these have been admitted to sanatorium and six are under treatment at home. The total number admitted to sanatorium was 77, or 62.2 per cent of all active cases.

After consultation with Dr. D. A. Carmichael, Superintendent of the Royal Ottawa Sanatorium, and Dr. Arthur Powers, Superintendent of the St. Laurent Sanatorium, twenty-three cases, resident in Ottawa and Hull, were allowed to remain at home under treatment. These are under the care of their private physicians and are also being periodically examined by the chest clinics in the city where they reside.

Seven were allowed to continue at work under close supervision. Two of these have extra-pulmonary tuberculosis and are under the care of their family physicians. Investigation of the five cases of pulmonary tuberculosis showed that sanatorium treatment offered no prospect of improvement or cure. Two had thoracoplasty operations and the remaining three are elderly individuals with sputum positive only on culture. In each of these five cases arrangements were made with the heads of the departments concerned for their isolation at work. They will be followed frequently by one of the city chest clinics or their personal physicians.

Seven persons thought to have active disease refused sanatorium treatment. They all stopped work immediately and the medical officer of health and their private physicians were notified.

TABLE V

DISPOSITION OF ACTIVE CASES
(120 cases)

1. *Admitted to Sanatorium*		
(*a*) Ontario:		
Royal Ottawa Sanatorium	29	
Queen Alexandra Sanatorium, London	10	
St. Lawrence Sanatorium, Cornwall	9	
Mountain Sanatorium, Hamilton	6	
Muskoka Sanatorium, Gravenhurst	6	
Toronto Hospital, Weston	3	
Freeport Sanatorium, Kitchener	2	
Brant Sanatorium, Brantford	2	
Total	67	
(*b*) St. Laurent Sanatorium, Hull, Quebec	4	
(*c*) Sanatoria in other provinces and Newfoundland	6	
Total		77 — 64.2%
2. *Under Treatment at Home*		
(*a*) Ottawa	16	
(*b*) Hull, Quebec, and vicinity	7	
(*c*) In other provinces	6	
Total		29 — 24.2%
3. *Allowed to continue at work with special arrangements made for isolation and observation*		7 — 5.8%
4. *Refused treatment, but have stopped work*		7 — 5.8%
Total		120 — 100%

ANALYSIS OF RESIDENCE

Since the outbreak of war in September, 1939, there has been an increase of over 20,000 in the Ottawa Federal Civil Service. As a large percentage of these wartime employees came from elsewhere in Ontario and the other Provinces of Canada, a study was made of the residence and original domicile of the active cases (Table VI).

TABLE VI

RESIDENCE AT TIME ACTIVE DISEASE WAS DISCOVERED

Ottawa	102
Ontario municipalities outside Ottawa	8
Hull, Quebec, and district	10
Total	120

LENGTH OF RESIDENCE

	Resident prior to Sept., 1939	Resident over one year and less than four years	Resident less than one year	Total
Ottawa	56	34	12	102
Ontario municipalities adjoining Ottawa	6	1	1	8
Hull and vicinity, Quebec	8	1	1	10
Total	70	36	14	120

Permanent residents of Ottawa and District (including Hull, Quebec, and vicinity)	70 — 58.3%
Wartime residents	50 — 41.7%

Seventy (58.3 per cent) were considered permanent residents of Ottawa and district as they had been domiciled there prior to the outbreak of the war. Fifty, or 41.7 per cent, came to the Federal District area subsequent to this and have been classified as temporary or wartime residents. Seventeen or 34 per cent of this latter group came from elsewhere in Ontario and thirty-three or 66 per cent came from other Provinces, as well as Newfoundland.

A wide variety of other abnormal non-tuberculous thoracic conditions were found and reported (Table VII). The value of such a mass X-ray survey is evident in that many diseased conditions were discovered of which the individuals were not previously cognizant.

TABLE VII

ABNORMAL THORACIC CONDITIONS FOUND AND REPORTED

Cyst of lung	1
Empyæma—healed with rib resection	22
Asthma	4
Atelectasis of lung	5
Bronchiectasis	18
Pneumonitis	25
Probable new growth	4
Dust inhalation	6
Abnormal heart	74
Non-tuberculous scarring	26
Scoliosis and kyphosis	90
Eventration of diaphragm or diaphragmatic hernia	4
Spontaneous pneumothorax	3
Probable fungus infection	2
Non-tuberculous basal disease	7
Chronic bronchitis or emphysema	2
Undiagnosed	1
Total	294

Due to the prevalence of atypical pneumonia during the winter of 1943-44, care had to be observed to rule out the possibility of this condition before

making a definite diagnosis of pulmonary tuberculosis. There were twenty-five such cases found in the survey, all of whom showed complete clearing on repeat 14″ x 17″ films within two months.

Summary

1. One hundred and twenty cases of active tuberculosis were reported among 30,260 Federal Civil Servants examined.

2. One hundred and thirteen or 94.1 per cent of the cases of active tuberculosis were satisfactorily disposed of.

3. The incidence of active tuberculosis found in this survey, of what might be called a selective group, is 0.39 per cent or roughly four in every thousand people examined. This was three times the average found in a other Ontario surveys in 1943.

It is thought that some of the reasons for the high percentage of active cases found in this survey are: (*a*) the influx of people to the City of Ottawa and district from other Provinces and sections of Ontario where the incidence of tuberculosis is much higher than the average for the Province as a whole; (*b*) the crowded living conditions in Ottawa; and (*c*) certain economic factors.

4. Of the 80 newly discovered cases analysed, only 10 per cent had consulted a physician within the past year and a very considerable number gave a history of contact and pleurisy. Also, there were 32 previously known cases which were shown to have become re-activated. It is apparent from these facts that preventive services are inadequate.

5. The Federal Civil Servants gave every co-operation during the survey.

6. This is the largest X-ray survey of a single civilian group in one local area that has been done in Ontario.

Recording Child Hygiene Activities in Calgary

W. H. HILL, M.D.
Medical Officer of Health
Calgary, Alberta

PRIOR to 1935, the Health Department of the City of Calgary was of a type to be found in a great many places at that time. The City administration had only just reached the conclusion that the many problems relating to the maintenance of public health should be in the hands of trained personnel and had already taken steps to bring about a complete re-organization of the Department, which was initiated in the amalgamation of all health services throughout the city under the direction of the City's Department of Health.

The ways and means of expediting the duties of the Department were, of course, left in the hands of the medical officers, and all phases of the work were subjected to close scrutiny to discover and eliminate any possibility of the overlapping of activities. The staff, which had increased from 11 to 43, was regrouped, and definite duties assigned to the several groups.

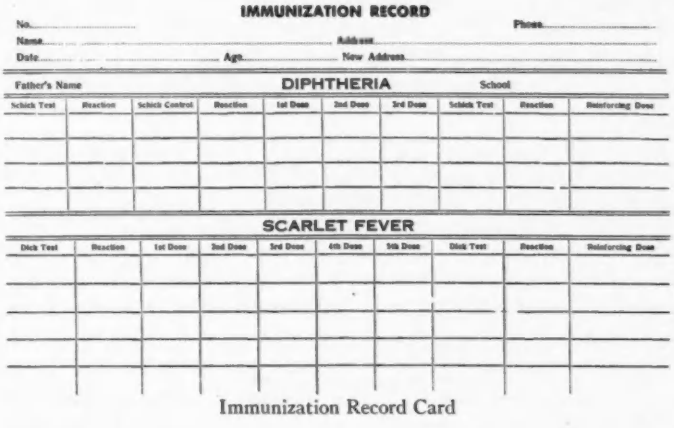
Up to 1935, and for some little time after that, no specific child hygiene program had existed. Calgary was most unfortunate at that time, and the existing program was designed to accomplish exactly nothing. Some few years prior to 1935, and due no doubt to some unfortunate misunderstanding, a second infant clinic was instituted in the city, more or less along private lines. This clinic was sponsored by a service club and operated by a public nursing body. In addition to the usual nutritional and diagnostic services, the clinic undertook treatment in some instances. It was established in opposition to the city's own strictly nutritional and diagnostic clinic at the City Hall and had a large attendance.

Our efforts at re-organization were based on the premise that, in so far as possible, a health record of every child resident in the city should be accessible to the Department. This situation had not obtained previously, since nothing was done for a child between the age of two years, when he ceased attending the Infant Clinic, and the age of six years, when he first went to school. The health record card instituted at the time the child was first taken to the Infant Clinic was removed when the child reached two years, filed away, and promptly forgotten. A new card came to light when the child entered school. This card lacked any information about the four intervening years. In short, the pre-school group was entirely neglected. The child was not seen, except as occasion required by the family doctor. Dental defects and early foci of infection made their appearance during these few years, and when the child was examined on entering school it was often found that a good deal of damage had already taken place. As a

Presented before the Sections of Epidemiology and Public Health Administration at the thirty-third annual meeting of the Canadian Public Health Association, held in the Royal York Hotel, Toronto, on November 6, 7 and 8, 1944.

consequence of the realization of this state of affairs, a very definite system of health recording was introduced.

Each Monday morning representatives of the Department visit the office of the Registrar of Vital Statistics and make a record of all the deaths registered during the previous week, and make a card for each child born during that week. A postcard is sent to the mother of each child, calling her attention to the services that are available at the Infant and Pre-School Clinics. A letter is sent also to



IMMUNIZATION RECORD

No. Phone
Name Address
Date Age New Address

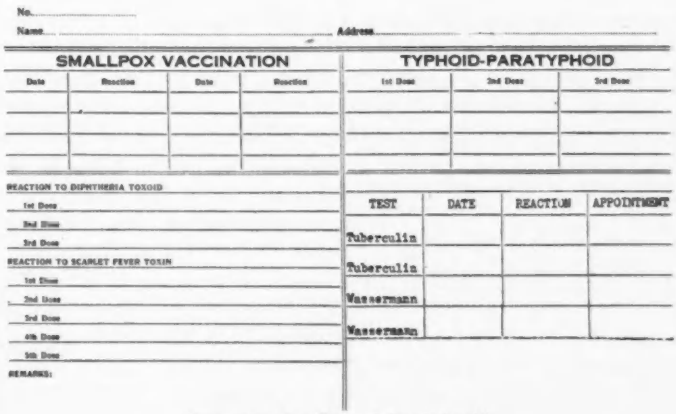
Father's Name **DIPHTHERIA** School

Schick Test	Reaction	Schick Control	Reaction	1st Dose	2nd Dose	3rd Dose	Schick Test	Reaction	Reinforcing Dose

SCARLET FEVER

Dick Test	Reaction	1st Dose	2nd Dose	3rd Dose	4th Dose	5th Dose	Dick Test	Reaction	Reinforcing Dose

Immunization Record Card



No.
Name Address

SMALLPOX VACCINATION

Date	Reaction	Date	Reaction

TYPHOID-PARATYPHOID

1st Dose	2nd Dose	3rd Dose

REACTION TO DIPHTHERIA TOXOID
1st Dose
2nd Dose
3rd Dose
REACTION TO SCARLET FEVER TOXIN
1st Dose
2nd Dose
3rd Dose
4th Dose
5th Dose
REMARKS:

TEST	DATE	REACTION	APPOINTMENT
Tuberculin			
Tuberculin			
Wassermann			
Wassermann			

Immunization Record Card (back)

the doctors attending each birth, requesting certain information of paramount importance in child-hygiene activities, and which he is best able to give; for example, the nature of the birth, any physical or mental abnormality in the family, and the home environment. Ninety-five per cent of the doctors co-operate. The remaining five per cent are visited by the nurse in charge of the Infant Clinic, and the information obtained in this way. This information is entered on the cards, which are then filed alphabetically by year, and separately by sex. The

Department has on file cards for 100 per cent of the city births each year. If a mother brings her baby to the Clinic (and many do), the card is available for the examining paediatrician to make any entries thereon.

When the child reaches the age of six months, a circular letter is sent to each mother, outlining the various preventive measures that are available, and inviting her to have her children protected against diphtheria, scarlet fever, pertussis and smallpox. The letter points out that this may be done by the family physician or in the Health Department.

When the child is between the age of three and four years, another circular letter is sent to the mother, inviting her to bring the child to the Pre-School Clinic for a complete physical examination. Appointments are made at set times for a certain number of children each afternoon, and a fair percentage of children of this age are seen.

The Clinic always has in mind the possibility that a child may be making an initial appearance in so far as the Department is concerned, and avails itself of this or any other opportunity to gather the information so necessary to complete the health record on the card. Especially do they inquire into the immunization history.

Prior to the child's entrance to school—between the age of five and six years—an extra effort is made to examine all children not previously examined. Some of these children are examined at the schools near their places of residence, and some at the Pre-School Clinic. The parents or guardians accompany the children, and again the Clinic has an eye to the completion of the cards.

At the beginning of the school term, the school nurses take from the Clinic files the physical record cards for the children entering school. The cards are then entered in the files of the schools concerned and are in charge of the school nurses. Pertinent information is recorded on the cards each time the child is examined. Examinations are made in Grades 1, 3, 5 and 8 in the public schools and Grade 10 in the high schools.

At the end of each month, the School Board provides the Health Department with a list of children transferred from one school to another, those who have left the city, and also recent arrivals in the city who have entered the school for the first time. Cards are then transferred from one school to another, new cards are made out for the new arrivals, and the cards for those who have left the city are placed in an inactive file in the Health Department, where they are available should the child return to the city and re-enter school. On leaving high school the student's cards are returned to the inactive file in the Department where they are retained for a number of years. We have had occasion to refer to the cards in the inactive file in connection with enlistments, insurance, etc.

Each morning the newspapers are scanned, as is also the list of deaths obtained from the registrar each Monday morning, and cards of those who have died are removed from the files. This obviates the necessity for communication with a parent regarding a child who has died.

There are many ways of assessing values attaching to any procedures designed for the public welfare, and one of these is by comparing the situation

as it obtained yesterday with that to be observed today. Unfortunately, this is denied us in Calgary, by reason of the fact that our present procedure dates back only to 1935, prior to which records were not adequately kept, and as a consequence there is no basis for comparison. We have been able, however, to note a very nice progress from year to year. For many obvious reasons, it is not thought possible to attract 100 per cent of the child population to any public clinic. That they have not been invited is certainly not one the reasons. We have invited and will continue to invite the mothers to bring their babies to the Clinic. The Department never loses an opportunity to give the widest publicity to its activities in child hygiene.

The increasing attendance at the Infant and Pre-School Clinics is surely some criterion of their worth and usefulness. In 1936, of 1,274 city births, less than 25 per cent attended the Infant Clinic, as compared with approximately 60 per cent of the net birth rate in 1943. As mentioned before, our experience with the pre-school group is entirely new, and it is hoped that it will not be long before we can take this struggling infant problem of ours off the bottle and allow it to range at the table with the rest. We can only mention a 50 per cent attendance at the Pre-School Clinic. The City provides a full preventive dental service for the child group between the ages of 3 and approximately 14 years (public-school leaving).

The institution of the departmental system of record keeping has enabled a closer contact with every child in the city, and an intensification of our immunization program; approximately 65 per cent of the children have been immunized against diphtheria and vaccinated against smallpox.

Such is the picture in the City of Calgary. It is possible that we do not meet the situation as it obtains in other centres, but we have done and are doing our best, and have reason to believe that we are heading in the right direction.

The Department has not lost sight of the advantages of a well-planned educational program in its child-hygiene activities, and considerable work has been accomplished. The program consists of lectures and talks to home-and-school groups, home-nursing groups, young people's societies, service clubs, and in the schools directly. In a word, we are prepared to do anything to improve the health of the child population. That we have something to show for what we have done is amply evidenced by a lessening of the number of underweights in the schools, reduction in the number of heart cases discovered, less goitre, and a steady increase in the number of those immunized. We find, too, that parents are paying greater attention to our notifications of early defects found by the school medical staff.

The Construction and Use of Dietary Standards

A Statement Adopted by the Canadian Council on Nutrition, June 8, 1945

IN 1938 the Canadian Council on Nutrition, after considering the standards set forth by the Health Organization of the League of Nations, decided that those standards were not applicable to Canadian conditions and devised a set for that purpose. This set was replaced in 1942 when, for the sake of uniformity, the Council adopted the Recommended Allowances of the U.S. National Research Council, with several modifications. These recommended allowances have now been altered in several respects.

Dietary standards have been used for various purposes: (1) in planning food supplies for populations, (2) for evaluating the adequacy of observed intakes, (3) for educational purposes in advising persons with regard to the use of foods, and (4) in the construction of regulations under the Food and Drugs Act. Stemming from the second use, the results of dietary surveys have been used to demonstrate the wide-spread occurrence of deficiencies, for which in many cases there has been no other evidence. The lack of correlation between the results of dietary surveys and the physical condition of the subjects has caused a critical examination of this use of a dietary standard. Furthermore, in view of the lack of adequate information on requirements, dietary allowances are necessarily arbitrary in many respects and must be open to critical examination at any time, especially when new information becomes available.

The construction and the use of a dietary standard can be made clear by a simple illustration. If people are maintaining an approximately normal weight and if they are presumably healthy, it is probable that their calorie intake equals their energy requirements. Under those conditions, observed intakes can be taken as an index of calorie requirements. The data from two recent surveys (1) (2) are in good agreement with regard to the calorie supplies of presumably normal girls aged 12-15. The mean intake was found to be 2400 calories with a standard deviation of 400. Observed intakes were distributed equally on both sides of the mean. It might then be said that the average calorie requirement of girls of those ages is 2400 calories per day. If food supplies were planned for a group of girls 12-15, it would be satisfactory to do so on the basis of 2400 calories per girl per day. A sufficient amount of food would be made available to girls having requirements above the mean by the lower consumption of girls with requirements below the mean. The mean value of 2400 calories is, then, a useful figure in planning food supplies. Since the data show a distinct variation in individual requirements, as would be expected, the mean value should not be used as a criterion of adequacy of individual food supplies. For example, a girl using 2100 calories per day might or might not have a deficient supply but the deficiency could not be determined by comparing the intake to the average requirement for a large group.

It is possible to determine the mean requirement for calories, or for any nutrient, of a group of persons with certain characteristics. For each person in the group there would be a definite requirement for each nutrient. For the entire group there would be a series of individual requirements from which the mean or average could be calculated. The mean might be equal to the actual requirement of one or more individuals in the group but there would be a considerable number of individual requirements on either side of the mean, some of them widely different from it.

It is obvious, therefore, that the use of a single figure for the nutrient requirement of a group of persons would have more limited usefulness than is generally understood in the use of recommended allowances. A single figure, if it is a mean value, might be used to determine the quantity of food needed by the group in question, and by the population represented. Individual intakes should not be evaluated in terms of the mean alone.

Failure to appreciate the limited usefulness of recommended allowances has been the chief factor in the misuse of such recommendations and has been, also, the chief cause for the error of the claims for alleged wide-spread deficiencies.

The construction of dietary standards is made difficult at present because of the lack of information regarding individual requirements. Suppose that it is desired to set up a standard for thiamin for sedentary men. Obviously it will be necessary to know the individual requirements for a significant number of such men. If that information were available, there would be a range of requirements for which a mean could be calculated. It could then be said that the thiamin requirement of any sedentary man would be some value within this range. The mean value could be used to determine the total thiamin requirements of a group of sedentary men. The essential information is not available for thiamin or for most other nutrients.

It is possible to use existing information, meagre as it is, to obtain approximations which could be employed to plan food supplies for a population but which would not be good enough to assess adequacy of intakes. Such approximations might be as follows:

1. *Calories.* The following figures appear to be satisfactory for use at present as means:

Man, moderately active	3000 calories
Woman, moderately active	2500 "
Children 1-3 years	1200 "
4-6 years	1600 "
7-9 years	2000 "
10-11 years	2500 "
Girls 13-20 years	2400 "
Boys 13-15 years	3200 "
16-20 years	3800 "

2. *Protein.* It would appear that adults can remain in health with protein intakes varying between 35 and 300 grams per day, provided that all the essential amino acids are furnished in adequate amounts. There is good reason to think that protein needs are relatively increased by growth, and by pregnancy and lactation. An usable approximation at present would be a statement that the protein supply should be sufficient to constitute 12

per cent of the total calories, except that the proportions should be increased to 15 per cent for children and for pregnant and nursing women.

3. *Iron.* It is likely that the average iron supply for men should be at least 6 mg. per day and that of women 12 mg. per day. An approximation might be a mean intake of 6 mg. for young children and men and 12 mg. for adolescents and women.

4. *Calcium.* Suitable mean intakes might be: adults, 0.6 gram per day; expectant and nursing mothers, 1 gram per day; children, 1 gram per day.

5. *Vitamin A.* It might be sufficient, in view of the dearth of information, to use a mean value of 3000 units per person per day for the entire population.

6. *Thiamin.* There appears to be some justification for expressing thiamin requirements in terms of a thiamin-calorie ratio. This may lie somewhere between 0.2 and 0.4 mg. thiamin for each 1000 calories; a mean value of 0.3 mg. could be used temporarily until further information is available.

7. *Riboflavin.* There is practically no information with regard to children, but 1.5 mg. per day seems to be sufficient for adults.

8. *Vitamin D.* There is no proof that adults require this vitamin. A supply of 400 to 800 units per day would appear to be advisable for all children.

9. *Ascorbic Acid.* Average intakes of 30 mg. per day for children and 50 mg. per day for adults appear to be sufficient.

It should be recognized that humans require other nutrients than those listed and provision should be made for supplies of iodine, phosphorus and other minerals, for niacin and perhaps other nutrients. It is assumed that there would be sufficient fat and carbohydrate if the calorie supply were adequate.

The difference between the above suggestions and any table of single values in current use is obvious and the reasons for the differences are given above. Because of the accuracy which is falsely conveyed and because of the seriousness of their misuse, it would be advisable to discontinue the use in Canada of the Allowances adopted by the Canadian Council on Nutrition in 1942.

There is an urgent need for measurements of individual requirements of various nutrients for a sufficient number of persons of various types so that ranges of requirements and means could be determined. Until such information is available, it is proposed that approximations, such as those suggested above, could be used in planning food supplies. They could not be used as criteria of adequacy of individual intakes.

The acute scarcity of foods in many countries, a scarcity which is likely to continue for several years, and which will make necessary the shipment of supplies from more fortunate countries, will make essential a great deal of attention to the planning of food production and distribution. It will be advisable to avoid the existence of excess supplies in one country and

acute scarcities in another. So much attention has been given in recent years to the possible occurrence of nutritional deficiencies, that it is difficult to realize that states of excess nutrition can exist. In the case of calories, a supply greater than need is known to be harmful for men and women past forty. While it is not possible at present to state whether harm results from excesses of vitamins, minerals and other nutrients, the provision of excess supplies is certainly undesirable at the present time in view of the urgent need for food in many parts of the world. The goal of nutrition should be to see that each person has a supply of food sufficient to satisfy his or her needs. Such a goal implies the prevention of deficiencies. It should also mean the prevention of excess intakes which may, in one instance at least, be harmful and in any case are wasteful.

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A Nutrition Survey in Ste. Anne de Bellevue, Quebec

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PART 1. FOOD SURVEY

THE importance of dietary adequacy in the care of boarding-school children has been stressed by the nutritionist of the Nutrition Division, Department of Health and Social Welfare, Quebec (1). It was felt that a nutrition survey of such an institution would be informative and helpful, and it was arranged, therefore, to carry out a survey at the Convent of the Soeurs de la Congregation de Nôtre Dame, Ste. Anne de Bellevue, Quebec. A record of total food intake of a group of 16 adults and 43 girl boarders was kept for a week, May 4-10, 1943. The girls, ranging in age from 7 to 16 years, came from Montreal, nearby Ile Perrot village and farms, points in Quebec province and from Ste. Anne's. They boarded for an average of three school years.

The object of the food survey was to determine to what extent the average daily food intake of the group approached the recommended daily allowances of food constituents approved in 1941 by the U.S. National Research Council and adapted for use in Canada by the Canadian Council on Nutrition. Hereafter the term Canadian standard refers to the above adapted recommended daily allowances.

Procedure

All food on hand at the beginning of the week was weighed. A record was kept of food bought during the week, of food wastage including peelings, etc., and of what remained at the end of the survey period. In this way, the weight of food actually eaten was recorded. No individual food records were kept, except for the extra fruit, milk, and cod liver oil received by certain children. A record of attendance was kept and allowance made for meals missed or eaten by visitors. The menu for each day was recorded to show how the food was actually used.

Food Consumption and Analysis

The amount of each food consumed during the week was expressed in grams and analysed according to standard food tables, raw food values being largely used. The total amount of each nutrient was corrected for meals missed or eaten by visitors (by multiplying by the factor 1.02) and was then expressed as a daily average. This was compared with the Canadian standard for the group expressed as the sum of the individual daily requirements of the fifty-nine persons making up the group. Table I shows the results described.

TABLE I

STE. ANNE'S CONVENT NUTRITION SURVEY

Actual Food Consumed—May 4-10, inclusive, 1943

	T. Cals.	Prot. gms.	Ca. gms.	Fe. mg.	Vit. A I.U.	Thiamin mgms.	Ascorbic Acid mgms.	Ribo-flavin mgms.	Niacin mgms.
Grand total.....	806,773	23,785	346	4,437	1,753,133	343	24,688	670	4,076
X 1.02.....	822,908	24,261	352	4,526	1,788,196	350	25,182	683	4,158
÷ 7 = daily intake	117,558	3,466	50	647	255,457	50	3,597	98	594
Canadian standard	146,100	4,000	63	727	270,000	76	4,265	112	761
Per cent of "	81	87	80	89	95	66	84	87	78

Analysis:

The following food constituents are discussed in regard to their provision in the diet.

1. *Calories:* Analysis of the food showed that the average calorie intake for the group was 81 per cent of the standard. The distribution was as follows: fat 37 per cent, carbohydrate 51 per cent, and protein 12 per cent. This provided only a moderately good total food intake for growing children, not an excellent one. The material on height and weight of the children is presented in Part 2.

2. *Protein:* The average daily intake of protein for the group was 87 per cent of the standard. Fifty-one per cent of the total protein was from animal sources, which was a high proportion. The Canadian standard recommends that one-third of the protein should be from animal sources and that 12 per cent of total calories be consumed as protein. This was the actual percentage of calories from protein in the Ste. Anne's survey.

3. *Calcium:* The average daily intake of calcium for the whole group was 81 per cent of the standard. Since many (23 out of 43) of the children received no extra milk, their intake of calcium must have been considerably lower than the average. Unpasteurized milk was the greatest single contributor of calcium in the diet. In this survey, milk and cheese supplied 73 per cent of the calcium. The large proportion of white bread eaten supplied almost as much calcium as all the fruits and vegetables combined.

4. *Iron:* The average daily iron intake was 89 per cent of the standard. Milk, white bread, and potatoes supplied about 40 per cent of the iron, because they were consumed in relatively large amounts. Meat and other high protein foods supplied another 40 per cent. It was notable that approximately 10 per cent of the daily intake was from black molasses.

5. *Vitamin A:* The average daily intake of vitamin A was 95 per cent of the standard. This value did not include extra vitamin A taken as cod liver oil, as there were relatively few children getting the extra cod liver oil in any form. About 33 per cent of the vitamin A came from fruits and vegetables. Another 65 per cent was supplied by milk, butter, and eggs; butter was the greatest single contributor, supplying one-third of the day's intake.

6. *Thiamin:* The average daily consumption of thiamin was only 66 per cent of the standard. Milk supplied one-third of the daily intake. Fruits

and vegetables supplied another one-third of the intake. The thiamin intake agreed well with the results of surveys in Toronto (3) and Quebec (4), a low thiamin intake being recorded in each case. About 15 per cent only of the daily intake was supplied by bread, since 98 per cent of the bread used was white. The white bread was not made with Canada Approved flour. The extremely low intake of vitamin B_1 may have decreased the appetities of the children, and in this way account partially for the low calorie intake.

In a very interesting experiment with rats, Higgins *et al* (7) have shown the effect of feeding rats a thiamin-low diet of the type consumed by human beings. The food intake per rat per day improved greatly when the flour used was fortified with thiamin and riboflavin. In the human field the ratio of thiamin (in micrograms) to non-fat calories is 0.3 or less when clinical beriberi appears (8). The present survey showed a ratio of 0.68, which is well above the danger level. Nonetheless, if the white bread had been replaced by an equal amount of Canada Approved white bread (180 I.U. B_1 per lb.), the thiamin intake would have been increased from 66 to 71 per cent. Moreover, if all the white bread had been replaced by Canada Approved brown bread (260 I.U. B_1 per lb.) the thiamin intake would have been increased to 80 per cent of the recommended allowance.

7. *Ascorbic Acid:* The daily average consumption of ascorbic acid was 84 per cent of the standard. However, those receiving no extra oranges (19 out of 43) undoubtedly had much lower intakes. In the East York survey (5) three-quarters of the girls had intakes less than 70 per cent of the standard. The Winnipeg survey (9) showed that 83 per cent of the families had diets markedly deficient in vitamin C, in February.

In the Ste. Anne's survey in May, milk and vegetables, mainly potatoes, together supplied one-third of the daily intake. The remaining two-thirds was supplied by the fruit. Fifty-three per cent of the daily average intake was supplied by oranges alone. This emphasizes the importance of oranges in the diet. Only about 4 per cent of the daily intake was supplied by tomatoes, as only seven pounds of canned tomatoes were used during the entire week. Bessey *et al*, in a report on the ascorbic acid requirement of children (10), have stated, "Just as milk is the only reliable source of calcium, so also citrus fruits and tomatoes are the only reliable sources of vitamin C." The truth of this statement seems to be substantiated by the findings of this survey.

8. *Riboflavin:* The average daily consumption of riboflavin was 87 per cent of the standard. This was good in contrast to the marked deficiency found in a rural survey in Nova Scotia (11). Milk was the best single contributor of riboflavin to the diet, furnishing two-thirds of the daily average intake. Since many (23 out of 43) of the children received no extra milk, their intake of riboflavin must have been well below the average.

9. *Nicotinic Acid:* The average consumption of niacin was 78 per cent of the standard. This was a fair intake but the value was not reliable, as niacin values could not be obtained for all the foods used during the week of the survey.

Recommendations to the Convent

1. White bread should be replaced by whole-wheat bread, using Canada Approved white bread occasionally to relieve monotony.
2. Whole-grain cooked breakfast cereals should replace prepared cereals as they are cheaper and more nutritious.
3. The cocoa served for breakfast should be made with more milk in order to be more inviting to the children who need the extra nourishment provided by milk.
4. Milk puddings could be used to supply extra milk to those who will not drink this important foodstuff.
5. Prunes or other fruit might to advantage replace candy as dessert.
6. The potatoes should be baked occasionally and boiled in their skins, instead of peeled and left soaking in cold water overnight.
7. More tomatoes (canned) should be used for the children, especially for those who are getting no extra oranges.
8. The children were given chocolate biscuits as a treat. Fruit would seem to be a better choice under the circumstances.
9. With Vitamin D poorly supplied in the average diet, there should be some special source provided such as fish liver oils. Only 8 of the 45 girls were receiving any vitamin D supplement.

Summary of Study of Food Intake

In a study conducted by the inventory method in a girls' boarding school in Quebec province, it was found that supplies of all nutrients were less than recommended allowances. The quantity of vitamin A was very nearly sufficient. The greatest discrepancy between the recommended allowance and the amount available was in the case of thiamin.

Part 2. Physical and Physiological Tests Associated with Food Survey

Tests were performed on thirty to forty boarding-school students in Ste. Anne's, Quebec, to determine what relation there might be between food consumption and general physical condition and the level of several vitamins and a mineral in blood and urine.

Physical Examination

With a group rather than an individual food survey the results of the physical examination cannot be correlated to diet. Moreover, the home feeding over several months of the year and for many years before entrance to boarding school is unknown and would affect the conclusions. However, an outline of some of the findings of the physical examination is given. The basis of the record for the physical examination was a compilation of Rowett Research Institute, Aberdeen, Scotland (unpublished).

(*a*) *Nutritional Status*

The nutritional status was assessed by the examining physician on four types of evidence; (1) general signs, as ill-developed and flabby musculature;

(2) specific signs such as occur in rickets or in skin conditions such as follicular hyperkeratosis or mouth conditions such as papillary atrophy of the tongue; (3) the clinician's subjective evaluation of nutrition; (4) the presence or absence of variations in excess of plus or minus 10 per cent of standard height and weight tables cited by Roberts (12).

Using these standards for judging nutritional status of the 40 girls examined, it was shown that only 35 per cent of the group were in the excellent and good class. This cannot be considered a good situation. On the other hand, the average intake of food constituents was reasonably good, with the exception of thiamin.

The appraisal of nutritional status by physical examination showed the following percentage of students in each category: excellent 10, good 25, fair 30, and poor 35.

(*b*) *Physical Defects Shown by Physical and Dental Examinations*

Generally dry skin was noted in 11 cases of the 40 examined: 11 showed definite dry, rough or thickened elbow and knee pads and 8 showed follicular hyperkeratosis of forearm or thigh.

Rickets were observed by 50 indications in 27 cases.

Flat feet were noted in 16 cases (40 per cent). Such a physical defect was considered of a very minor nature in the East York survey (5), where weak arches occurred among the 11 per cent of girls showing physical defects.

Past diseases were recorded in 36 cases: measles in 29, chickenpox in 14, whooping cough in 12, mumps in 10, pneumonia in 3, scarlet fever in 2, pleurisy and infantile paralysis each in 1, rheumatic endocarditis in 1.

Enlarged tonsils were observed in 12 cases. Tonsils had been removed in 5 cases.

The dental examination showed 24 permanent teeth missing in 16 cases, all of whom were over 10 years of age. Oral hygiene was considered fair to poor in 87.5 per cent of cases, while condition of the gingival tissues was in 75 per cent of cases fair to good. In the East York survey, similarly, no cases of marked gingivitis were seen, but processes of dental decay were markedly evident.

(*c*) *Height and Weight*

The Ste. Anne's boarding-school girls taking part in the tests ranged in age from 7 to 16 years. The Baldwin-Wood tables cited by Roberts (12) give heights and weights of school children 7 to 15 years only. Therefore, the sixteen-year-olds were not included in the Ste. Anne's group discussed below. A leeway of plus or minus 10 per cent was allowed in deciding whether an individual varied from the normal. It is interesting to note that the Ste. Anne's girls showed a range of height entirely within the normal but 17.5 per cent were overweight (and 12.5 per cent underweight) although the average calorie intake was only 81 per cent of the standard. There is just a possibility that the calorie requirement of these children is less than that of the Canadian standard due to the restful life of the convent.

In the Ste. Anne's group it was noticeable that only 10 per cent of the

children were underweight amongst those drinking extra milk, in contrast to 31 per cent underweight amongst those not receiving extra milk. It was interesting that in the East York Survey (5) no correlation was found between the intake of calcium and height in the group as a whole. Similarly, there appeared to be no difference in the height of the Ste. Anne's children whether or not they drank extra milk.

In 1939, tables for height and weight of elementary school children in Toronto were revised (13). From these, standards were obtained by which two local Ste. Anne de Bellevue groups of girls were compared. The data on heights and weights of Macdonald High School girls were taken from the records of the local Protestant school. These girls are practically all of Anglo-Saxon origin, the Convent girls practically all French-Canadian (three out of forty with a partial Scottish ancestry). The comparisons in height and weight are tabulated in Table II.

TABLE II

COMPARISON OF HEIGHT AND WEIGHT OF TWO GROUPS OF STE. ANNE'S GIRLS

	Height Percentage			Weight Percentage		
	Under	Normal	Over	Under	Normal	Over
Standard (Toronto).....	25	50	25	25	50	25
Macdonald H.S.....	6	40	54	23	56	21
Ste. Anne's.....	42	44	14	19	39	42

The Ste. Anne's and Macdonald groups include both elementary and high school children aged 7 to 15 years whereas the Toronto survey included only elementary school children. Obviously, some of these older children in elementary school are backward. It was found in the Toronto survey that better scholars were larger and more physically perfect than their less brilliant fellows. This may account for the greater height of the Macdonald girls in comparison with the Toronto standard. The equally intelligent Ste. Anne's girls are shorter and heavier than the Macdonald girls. This may be a racial and inherited tendency.

Special Tests

(*a*) *Hæmoglobin*

The hæmoglobin was prepared as acid hæmatin and the amount determined with the use of the Evelyn Colorimeter. The average value for this group of girls was 13.7 $\pm$ 1.18 mgms. per 100 cc. Mack *et al* (14) suggest normal values of 12.8 to 15.28. The average of the present survey falls within that range, only five children falling below 12.8. This is to be expected since the food survey showed an iron intake 89 per cent of the Canadian standard. Girls 7 to 12 years of age and those 13 to 16 years of age each have an average value of 13.7, showing that in this group of children there is no difference in hæmoglobin value due to age. This is contrary to the findings of Mack *et al.*

Girls receiving both extra oranges and extra milk had an average reading of 13.9, whereas those receiving neither of these extra foods had a value of 13.2. This difference, however, is not significant.

(*b*) *Vitamin C Saturation Test*

The vitamin C saturation test of Harris (15) was used on 36 girls, with the following results:

Days of response	1	2	3	4	5	6	7
Number of girls	14	18	1	1	1	..	1

According to Harris, with boys an intake of 30 mg. vitamin C daily usually sufficed to give responses on the first or second day of dosing. The number of days beyond the second may be taken as an index of the relative deficiency in the past intake. Four of the girls were not saturated until after the second day. Therefore, these four probably fall into the deficient group.

The average daily intake of vitamin C at the convent, exclusive of extra fruit and milk, was 38 mgms. per person (including adults). Harris found that on a daily intake of 40 mgms. about half of the boys gave first-day responses and half second-day responses. The results at the convent were in good agreement with Harris' findings and the diet survey.

It should be noted that the extra fruit and milk used by certain children seemed to play some part in their response to the test dose. First-day responses were shown by 57 per cent of the children receiving both extra oranges and milk, by 40 per cent of those receiving extra quantities of either oranges or milk, and by none of those receiving no extra fruit and milk.

In connection with the dental examination, the following findings are of interest: Forty-four per cent of the girls having 0 to 5 caries showed first-day response, whereas only 31 per cent having 6 to 16 caries fell in this group; 50 per cent of those having good gingival tissues showed first-day response, whereas only 28 per cent of those having a fair to poor gingival condition fell in this group.

(*c*) *Riboflavin Excretion Test*

The riboflavin excretion test of Najjar and Holt (16) was used on 30 girls.

Najjar and Holt considered that an excretion of 20 per cent or more of the test dose showed previous adequacy of riboflavin in the diet. Twenty-seven of the 30 girls fell into this class, with excretions from 20 to over 50 per cent; only 3 had under 20 per cent excretion, indicating previous deficiency of riboflavin.

These results are in fair agreement with the diet survey which showed that the daily average intake of riboflavin was 87 per cent of the Canadian standard. Since milk provided two-thirds of the day's average intake of riboflavin, it is of some interest to note that a larger number of children receiving extra milk had good excretion of riboflavin (over 30 per cent) than those not receiving the extra milk. None of those with a poor excretion (under 20 per cent) drank extra milk.

The above results are explained further by the following data:

Average daily requirement of riboflavin, for the group	1.9 mg.
Average daily provision of riboflavin, including that from extra milk	1.65 mg.
Average daily provision of riboflavin, excluding that from extra milk	1.30 mg.
Average daily provision of riboflavin to 20 girls drinking extra milk	2.44 mg.

(*d*) *Vitamin A*

Two independent tests were used to determine the adequacy of the diet with respect to vitamin A.

(1) Biophotometer readings were made on each child, using the apparatus of Goss *et al* (17). As there was a highly significant correlation between the second and third readings, these were averaged to give a single value for each girl. No difference in reading time was found between the children receiving extra milk and those receiving no extra milk. This was to be expected, however, since butter (and not milk) was the greatest single contributor of vitamin A to the diet, supplying one-third of the day's intake.

(2) Vitamin A in the blood was determined by the method of Kimble (18). The carotene was determined at the same time. No correlation was found between blood vitamin A and carotene, blood vitamin A, and the biophotometer reading, nor between carotene and the biophotometer test. There was no difference between the group getting extra milk and those receiving no extra milk as shown by the blood vitamin A or the carotene.

Discussion

As mentioned earlier, the group dietary survey does not allow the correlation of findings from physical or physiological tests to the diet. There appeared to be fair agreement, however, in the ascorbic acid and riboflavin excretion tests and in the hæmoglobin (iron) test, with the average intake of these food constituents as determined by the diet survey. Neither of the vitamin A tests, on the other hand, showed any relation to the amount of vitamin A supplied by the diet.

The material on height and weight comparisons may be helpful in considering differences in racial characteristics.

Assessment of nutritional status in small groups with controlled feeding could provide valuable information when standards for method and presentation of results can be followed and when supplemented with information regarding home feeding conditions.

The present survey might call attention to the value of appraisal of food intake in boarding schools.

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Mortality Reductions in Ontario, 1900-1942

II

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IN a previous note (1) the age-specific death rates of all causes combined in Ontario from 1900 to 1942 were outlined. In all age groups under thirty (infancy, 1-4, 5-9, 10-14, 15-19, 20-29), the rates showed approximately equal rates of decline, the declines *per se* being fully two-thirds of the rates of 1900, and more than double those of 1942. In the 30-39 age group the rates showed a reduction of fully one-half and in the 40-49 age group, a reduction of fully one-third. In the age groups of 50 and over there was little if any evidence of decline. A question as to how much of the reductions noted can be actually counted a direct result of medical and public health activity or how much occurred as a result of other factors was raised.

This question raises another to be answered first: In what specific causes of death have there been reductions—and in what have there been increases offsetting the reductions? Even the man on the street, from his own experience, would possibly venture the opinion that fewer deaths from diphtheria, tuberculosis, and typhoid fever account for a large part of the declines. He would be right in part. He might even suggest that deaths from accidents, from heart disease, and from cancer had increased so as to reduce other gains, but in this he would recognize the need for more definite information. A fuller answer on a sounder basis should be available in the reports of the Registrar-General. It is the purpose here, therefore, briefly to review mortality of those specific causes in which there have been definite and substantial changes contributing significantly to the total change in each age group under 50 years. Little need be said regarding increases. In the younger age groups, particularly under one year, there has been an increase in deaths charged to accidents and violence, but it is so small in comparison with declines in other causes that it does not offset any significant part, numerically, of the total declines. Increases have been recorded, too, in the 40-49 age group, from cancer, heart disease, and arterial disease, but these are of very questionable validity, being due largely, if not entirely, to changes in diagnosis and certification (2). Suffice it here then, solely and simply to outline the rates of those specific causes or groups in which there have been substantial and realistic declines and to assess in round numbers the amount of the declines and the relative contribution made by them to the total decline in the various age groups. This does not entail identification of the small and often erratic changes in many causes nor does it include any detailed or critical analysis of the trend or of the many factors influencing the trend in any of the causes specified.

As is common knowledge, or should be, specific causes of death cannot be

traced or compared with an accuracy even approaching that possible in dealing with all causes. Over the years, changes occur in diagnostic methods, ability, equipment, and even in fashion, and therefore in diagnosis itself; in frankness and completeness of certification and even in its vogue. It is impossible to identify, precisely, where or when, or to assess how much these changes have influenced the recorded rates. Changes occur too in classification and tabulation; these can be identified and the disparities due to them can be largely controlled, though perhaps not entirely eliminated, by grouping certain classifications so that the figures refer, as far as possible, to the same condition throughout the period. Such groupings are made in the rates presented here. In considering and interpreting the data, the reader, aware of their characteristics—their inherent limitations, their utter dependency on man, on his varying qualifications and his proneness to change; their lack, for many reasons, of direct comparability over any long period of time—will not draw too fine comparisons, but will condition his conclusions with due reservation. Such caution is not criticism of vital statistics, nor does it imply that vital statistics are erroneous. It is in the interpretation of vital statistics without due regard for their essential qualities, their inescapable vagaries and inconsistencies, that the error lies.

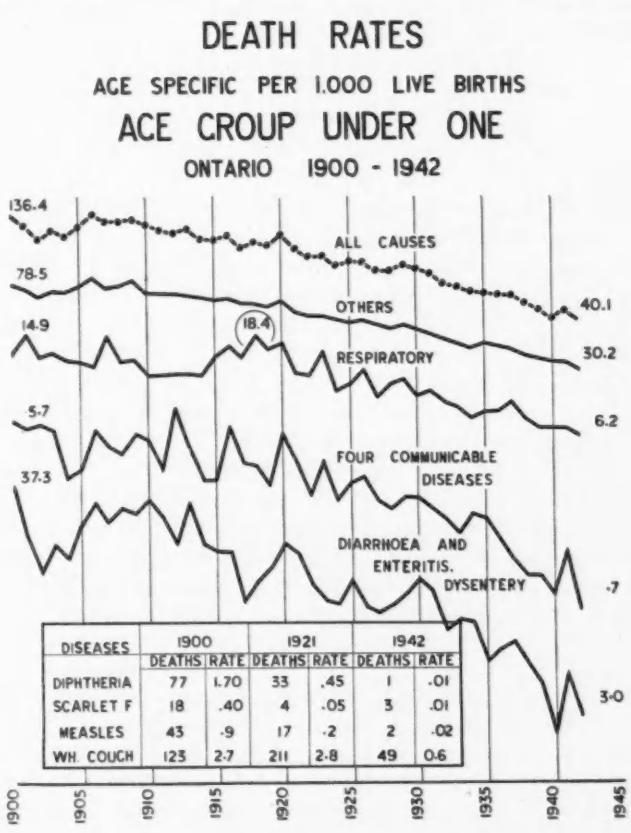
For each age group, as intimated, the death rates are shown for those causes in which the recorded reductions can be accepted with some degree of assurance as having contributed actually and substantially to the total reduction in the age group. The rates for all other deaths are grouped together under "others". This miscellaneous group, differently constituted in different ages, necessarily includes many categories showing declines, some of which are real but small in comparison with the total decrease of the respective age group, e.g. that in diabetes in several groups, tuberculosis in infancy, or diphtheria in adult life; others in which the figures are quite unreliable, e.g. in pernicious anaemia or syphilis; and still others, even considerable in number but in categories lacking in specificity of diagnosis, e.g. convulsions, anaemia, ill-defined causes. The rates for all causes are also shown. The outlines have been made by plotting the various death rates on semi-logarithmic paper and transposing the lines thus obtained to blank paper where they are placed, not in order of magnitude of rates, nor of rate or amount of decline, but so as to lie clearly with crossing kept to a minimum.* Proportionate declines or, in other words, the rates of declines, are readily compared in the degree of parallelism of the lines or the departure from it. To obtain any concept of the actual amount of decline, some mental calculation must be made from the rates of 1900 to 1942, as given at the respective ends of the lines. It will be appreciated that the specific rates for any two single years, by themselves, have little or no value as a basis for such calculation; but when a rate is in fair agreement with the rates of immediately preceding or succeeding years, or consistently continues a trend, or shows a change consistent with similar changes in other age groups at the same time, it can be taken as a fair index and used, with due precautions, in such comparisons as are made here.

**The data on which the plates are based are available on request to the Department of Epidemiology and Biometrics, School of Hygiene, University of Toronto.*

The Age Group Under One
(Infant Mortality)

Reference has been made previously (1) to the added uncertainty of the rates of infant mortality due to the disproportionate lack of completeness of the reporting of both births and infant deaths. Possibly in the early years of the survey, deaths were better reported than births, so that the actual death rates may have been lower at that time; general experience, however, would suggest that the infant mortality rates were actually higher than those recorded. There has been improvement in reporting of both births and deaths, an improvement most marked just at the turn of the century. At the present time, it would appear conservative to say that the reporting of both is well over 90 per cent, and probably closer to 100 per cent.

The recorded infant mortality rate in 1900 was 136.4 per 1,000 live births; in 1942 it was 40.1. Apart from the probably fictitiously low rates previous to 1906, the tendency to a uniform fall throughout the period is rather striking. There are, of course, some interruptions extending over one, two, or three years.



DISEASES	1900		1921		1942	
	DEATHS	RATE	DEATHS	RATE	DEATHS	RATE
DIPHTHERIA	77	1.70	33	.45	1	.01
SCARLET F	18	.40	4	.05	3	.01
MEASLES	43	.9	17	.2	2	.02
WH. COUCH	123	2.7	211	2.8	49	0.6

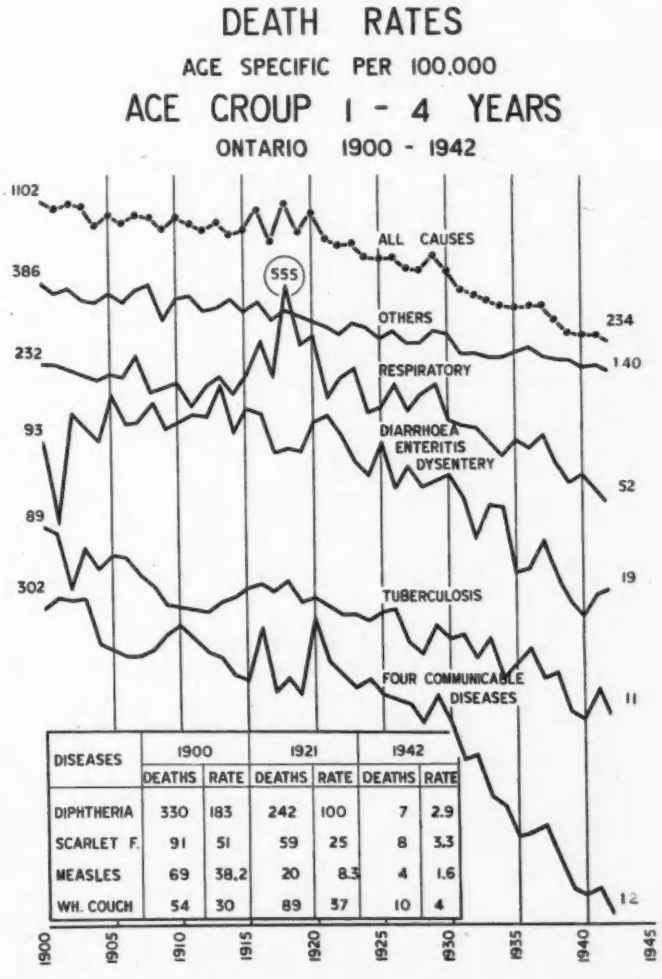
Of these, that of 1920 is the most outstanding, the excess in all causes in that year being provided by excess rates in each of the causes specified as well as in "others", while measles, scarlet fever, and whooping cough showed high epidemic peaks and diphtheria rose to a higher figure than it had reached since 1904. The coincidence of the peaks, not only in the four communicable diseases but also in diarrhoea and enteritis, in the respiratory group, which includes influenza, and in "others", indicates fairly clearly the influence of one condition on the *recorded* mortality of other conditions. The lack of any great excess in mortality in this age group in 1918 and the presence of considerable excess in 1916 may be noted and contrasted with other age groups.

The reduction in the recorded rates from the beginning to the end of the period is in the neighbourhood of 100 (actually 96.3) per 1,000 live births, which is more than two-thirds the rate of 1900, and considerably more than twice that of 1942. The recorded figures for diarrhoea, enteritis and dysentery show a fall from 37.3 per 1,000 live births in 1900 to 3 in 1942, a reduction of 34.3 which, by itself, accounts for one-third of the total improvement in infant mortality. The infant death rates for the four communicable diseases, diphtheria, scarlet fever, measles, and whooping cough combined, fall from 5.7 to 0.7 per 1,000 births. As is evident in the figures in the table inset, the decline in diphtheria, both relatively and absolutely, has been very much more than the decline in scarlet fever or measles, and relatively but not absolutely in this age group, more than that in whooping cough. In other words, diphtheria has shown a decline from 1.7 to .01, a fall of 1.69 or about 99 per cent, while whooping cough has shown a decline from 2.7 to 0.6, a fall of 2.1 or 78 per cent. Mortality charged to the respiratory group has fallen from 14.9 to 6.2 per 1,000 births. In the three conditions specified, i.e., diarrhoea and enteritis (and dysentery), the four communicable diseases (diphtheria, scarlet fever, measles, whooping cough), and the respiratory group (including influenza), approximately one-half of the total reduction is identified while the other half is in the miscellaneous group of "others". The larger part of the decline in this miscellaneous group is in ill-defined causes, convulsions, congenital debility, and such categories lacking specificity of diagnosis. It is highly probable that if these deaths could be properly re-allocated to more specific diagnoses, they would appear, for the most part, in those indicated here, so that by far the larger part of the total reduction in infant mortality would be accounted for. The reader is free to make his own deductions. The increase in death rates from accidents and violence has been from 0.31 per 1,000 live births in 1900 to 1.24 in 1942, an increase which, as intimated, would have but little effect on the overall figures.

The Age Group 1-4 Years

In the 1-4 age group, the decline appears to have been faster in the second half of the period and the line is marked by sharper deviations than is that for infant mortality. The greatest up-swing appears in 1918, although the years 1916, 1920, and 1929 show noticeably excess rates. In these and other years of peak mortality, the excess in all causes is contributed, to some extent, by recorded

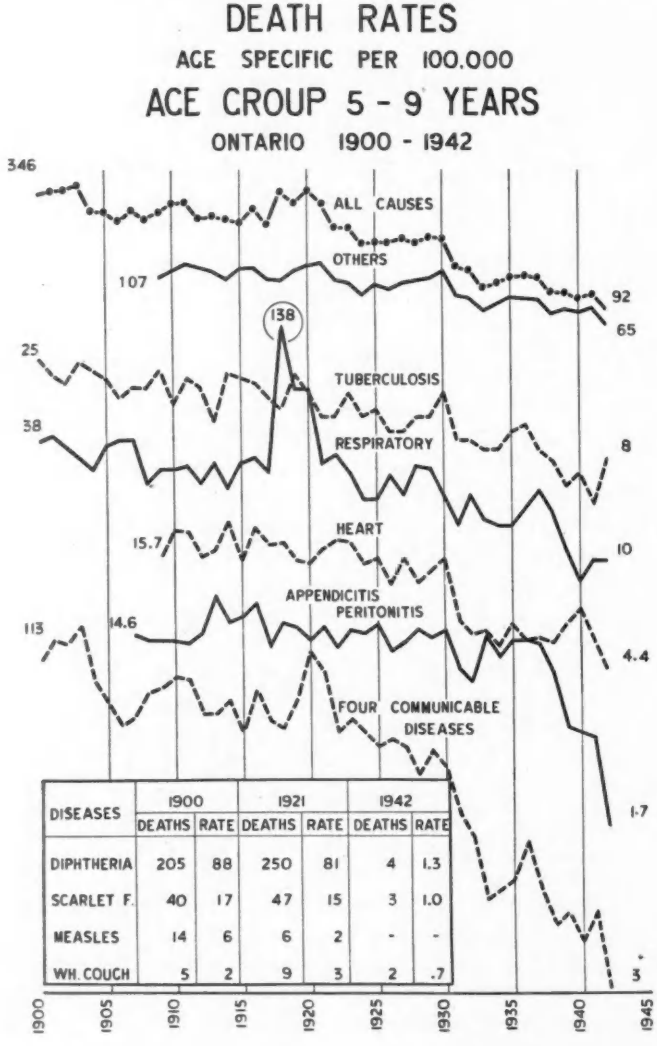
increases in the rates of communicable disease and the miscellaneous causes. The recorded death rate of all causes has fallen from 1,102 per 100,000 in 1900 to 234 per 100,000 in 1942. The major contributions to this reduction of 868 are from the communicable diseases (290), respiratory disease (180), tuberculosis (78), and diarrhoea and enteritis (74). These declines thus account for over two-thirds of the total reduction, the balance being recorded for the most part under the "ill-defined" and convulsions, included in "others". In the communicable diseases, it will be noted that the decline in diphtheria from 183 per 100,000 in 1900 to 2.9 in 1942 far exceeds, both absolutely and relatively in this age group, that in scarlet fever, measles or whooping cough.



DISEASES	1900		1921		1942	
	DEATHS	RATE	DEATHS	RATE	DEATHS	RATE
DIPHTHERIA	330	183	242	100	7	2.9
SCARLET F.	91	51	59	25	8	3.3
MEASLES	69	38.2	20	8.3	4	1.6
WH. COUGH	54	30	89	37	10	4

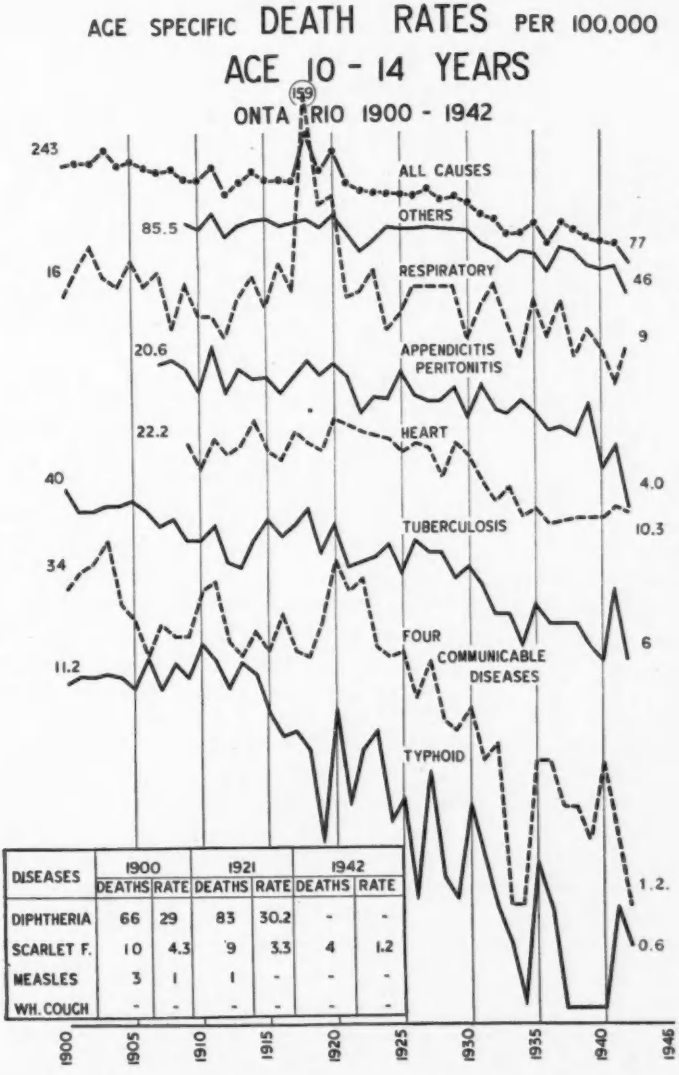
The Age Group 5-9

In the age group of 5-9, the decline in mortality from all causes from 346 per 100,000 in 1900 to 92 in 1942 has been more irregular than that in younger age groups. It will be noticed that in 1916 practically all the rates are high so as to contribute a very definite excess in the rate of mortality from all causes. The influence of influenza in 1918 is more marked in this group than in infancy or the pre-school group but the death rate of all causes in 1920 is higher than in 1918. The high rate of diphtheria in 1920 contributes very considerably to the excess in total causes in that year as well as in 1921 ; in the latter year, the miscellaneous



DISEASES	1900		1921		1942	
	DEATHS	RATE	DEATHS	RATE	DEATHS	RATE
DIPHTHERIA	205	88	250	81	4	1.3
SCARLET F.	40	17	47	15	3	1.0
MEASLES	14	6	6	2	-	-
WH. COUCH	5	2	9	3	2	.7

group of "others" shows, possibly fictitiously, a high peak. As diarrhoea and enteritis play only a relatively small part in this age group, these rates have been omitted. The rates of two other specific causes, rheumatic heart disease (including rheumatic fever), and appendicitis and peritonitis, have been added, not altogether on account of the actual extent of the declines, but because they are of such medical and public health interest in this as well as in other age groups. (The rates of these causes are shown only from 1909 and 1907 respectively.) Of the total decline of 254 per 100,000 nearly one-half (110) is attributable to the



DISEASES	1900		1921		1942	
	DEATHS	RATE	DEATHS	RATE	DEATHS	RATE
DIPHTHERIA	66	29	83	30.2	-	-
SCARLET F.	10	4.3	9	3.3	4	1.2
MEASLES	3	1	1	-	-	-
WH. COUGH	-	-	-	-	-	-

fall in communicable diseases, the decline in diphtheria far exceeding that in scarlet fever and, by itself, accounting for one-third of the total decline in mortality in this early school age. Measles and whooping cough play an almost insignificant part in this and older groups. The decline in death rates of the respiratory group contributes about 10 per cent of the total decline, and that in tuberculosis over 5 per cent. The fall in the rates of rheumatic heart disease in recent years and the precipitate decline in those of appendicitis and peritonitis, both of these declines being consistent with similar tendencies in other age

groups, contribute together about 10 per cent of the total decline. In the five conditions specified, therefore, the four communicable diseases, the respiratory group, tuberculosis, rheumatic heart disease, and appendicitis and peritonitis, over two-thirds of the total decline is identified, leaving about 30 per cent in the many and often uncertain classifications aggregated in the miscellaneous causes which now, in this 5-9 age group, includes diarrhoea and enteritis but not rheumatic heart disease or appendicitis.

The Age Group 10-14

In the 10-14 age group the rates for all causes are the smallest throughout life. The fall in typhoid fever becomes of such relative importance here as to warrant its separation from the miscellaneous causes. In the total decline from 243 to 77, or 166 per 100,000, tuberculosis has made the largest contribution, falling from 40 to 6. The communicable diseases are a close second, with diphtheria showing the greatest fall from a rate of 29 per 100,000 to 0 in 1942. The declines in the death rates of appendicitis and peritonitis, rheumatic heart disease, typhoid fever and respiratory disease have contributed lesser amounts. In the conditions specified, about two-thirds of the total reduction is identified. The relatively large but numerically small balance is made up of smaller declines in many other categories including diabetes, diarrhoea, enteritis and dysentery, meningitis, ill-defined causes, etc.

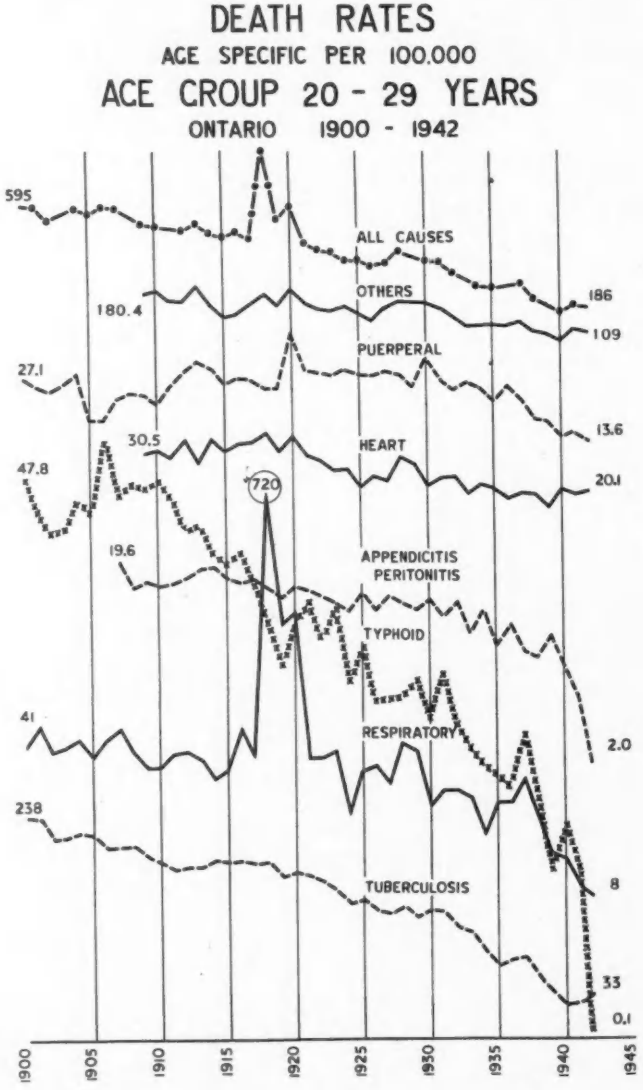
The Age Group 15-19

In this adolescent group the increasingly disproportionate excess in total mortality in 1918 is evident, as is also that effect which the outbreak of influenza had on the recorded mortality of the respiratory group and, as well, of other causes. The rates of all causes fall from 409 per 100,000 in 1900 to 146 in 1942, a reduction of 263 per 100,000. Approximately one-half of this decline is contributed by the fall in tuberculosis from 148 to 19 per 100,000. The fall in typhoid fever stands next (36.8), then respiratory disease (24), appendicitis (18), and rheumatic heart disease (8). Approximately 80 per cent of the total decline is recorded in these five causes, leaving only a small amount in the miscellaneous group, which here includes diphtheria and scarlet fever as well as meningitis, diabetes, diarrhoea and enteritis, ill-defined, etc.

The Age Group 20-29

This age shows the greatest proportionate effect of the 1918 influenza outbreak on mortality of all causes, and the greatest proportionate excess in the death rate of the respiratory group (including influenza). The rate for all causes in 1900 was 595 per 100,000 and in 1942, 186, a fall of 409 per 100,000. The rates for deaths charged to diseases associated with pregnancy are shown in this and the two subsequent groups. It will be noticed that these rates are calculated on a basis of the whole population in the age group, rather than on a basis of live births; thus they are subject to rise or fall with the birth rate, without, necessarily, any change in the maternal mortality rate per 1,000 births. The fall in recent years occurred, however, in spite of a rising birth rate and coincides with

a decline in the maternal mortality rate based on births. Of the total decline in all causes, one-half is accounted for by the fall in tuberculosis from 238 per 100,000 to 33. Typhoid fever, falling from 47.8 to 0.1 per 100,000, contributes in much the same proportion, about 10 per cent, as in the preceding age group. The fall in the respiratory group from a rate of 41 to 8 is very considerable, the figures perhaps exaggerating the true trend. So, too, the fall in appendicitis and peritonitis rates from 19.6 per 100,000 in 1907 to 2.0 in 1942. The decline in



heart disease from 30.5 to 20.1 is proportionately less than in the preceding age groups and of more questionable character. The differentiation of rheumatic heart disease from the degenerative or any other type on the basis of age, as has been necessary for this review, becomes already, even in this young adult group, less satisfactory. The deaths charged to heart disease in this decade undoubtedly include a number which are not rheumatic in origin but which cannot be otherwise segregated or eliminated. Further, in this age group, a part, probably a large part, of the deaths charged to apoplexy under its several classifications has its origin in rheumatic heart disease and really indicates the latter. These deaths, therefore, should be charged to rheumatic heart disease. As it is impossible to separate the deaths that should be so charged, the rates of apoplexy are included with those for rheumatic heart disease, thus reducing disparity caused by changes in classification of apoplexy, and maintaining a somewhat better degree of uniformity in the figures for comparison. With this grouping, nearly 80 per cent of the total decline in this age group is accounted for in the conditions specified, the small balance being distributed under other causes—diabetes, communicable disease, etc.

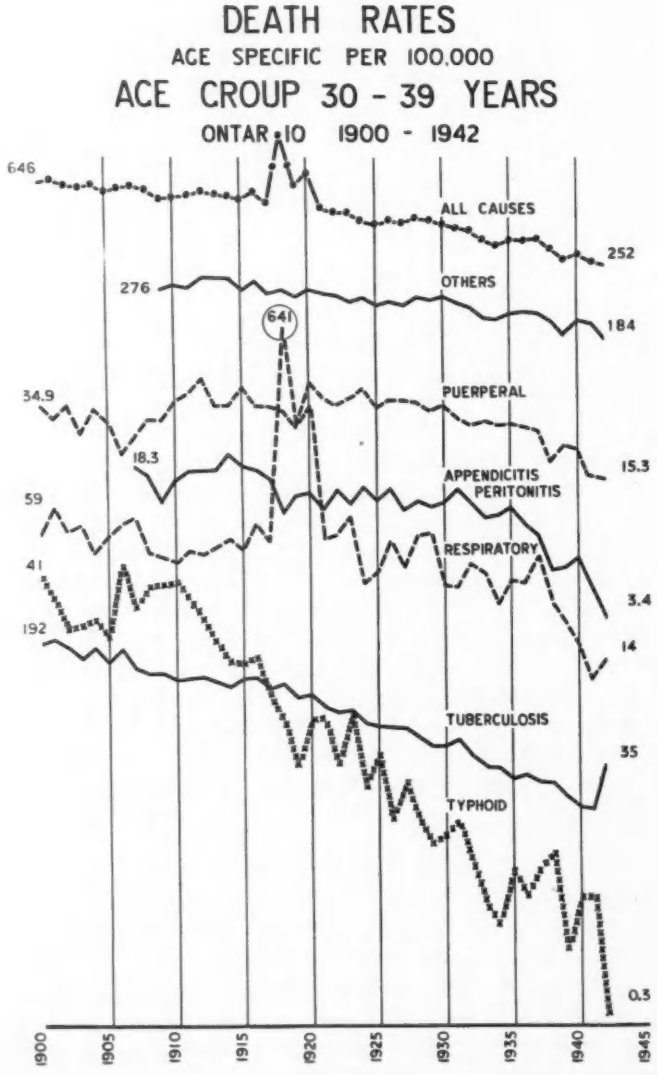
The Age Group 30-39

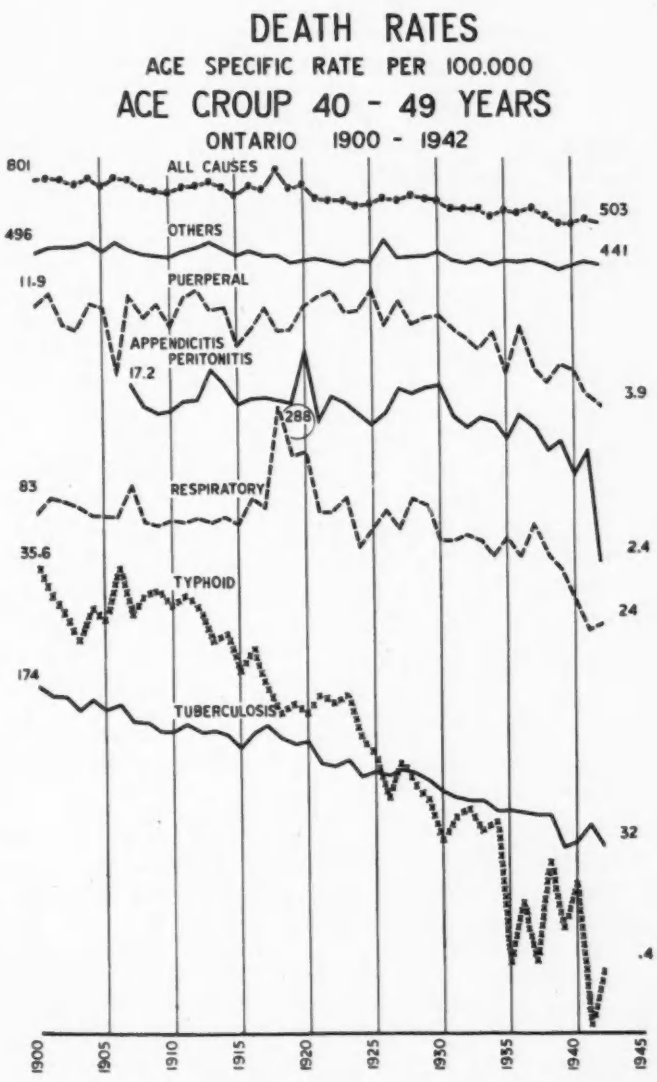
The decline in the death rates per 100,000 population in this age group from 646 in 1900 to 252 in 1942 or of 394 per 100,000 over the period is proportionately somewhat less than in younger age groups but is considerably more than one-half of the rate in 1900, and is much more than the rate in 1942. The proportionate effect of the 1918 influenza outbreak, though marked, is less so than in the 20-29 age group. As noted previously, the differentiation by age of rheumatic heart disease from other types is less permissible than at younger ages, and, as recorded heart disease death rates in this age group have not fallen, this category is not shown separately. The largest single contribution to the total reduction again comes from tuberculosis, the death rate falling from 192 per 100,000 in 1900 to 35 in 1942. The rates of the respiratory group fall, mostly in the last few years, from 59 in 1900 to 14, a fall, which, striking though it is, is possibly of less certain quality than the fall in the rates of typhoid fever from 41 to 0.3 per 100,000. In the rates of deaths associated with pregnancy, there is a decline somewhat similar to, though smaller than, that in the 20-29 age group. These few causes, as specified, account thus for over two-thirds of the total reduction, other causes such as diabetes, and pernicious anaemia contributing not insignificantly but in relatively small or uncertain amounts to the balance.

The Age Group 40-49

In the data for the fifth decade of life showing mortality rates of all causes reduced by fully one-third, from 801 in 1900 to 503 in 1942, the influence of influenza in 1918 is less marked than in the 15-39 age groups. The fall in tuberculosis from 174 per 100,000 to 32 again accounts for approximately one-half of the whole decline; that in the rates of respiratory disease, with less assurance of the stability of the trend, for about one-fifth of the decline; that in typhoid fever

for one-tenth, and that in appendicitis for about one-twentieth. Mortality associated with pregnancy, a hazard borne by much less than half of the population of the group, has fallen recently here too so as to reduce appreciably the total mortality. More than 80 per cent of the total decline is thus identified in these few conditions, tuberculosis, respiratory disease, typhoid fever, appendicitis and peritonitis, and diseases associated with pregnancy, the small balance being under diabetes, pernicious anaemia, and ill-defined causes found in the miscellaneous group.





Summary

In summary, then, the decline of fully two-thirds in the death rate in all age groups under 30, of fully one-half in the 30-39 age group, and fully one-third in the 40-49 age group, in Ontario from 1900 to 1942, is identified in large part (nearly 50 per cent to over 80 per cent in the various age groups) in the declines in a comparatively few specific causes or groups, namely, diarrhoea and enteritis, the common communicable diseases (principally diphtheria), tuberculosis, typhoid

fever, the respiratory group (including influenza), appendicitis and peritonitis, rheumatic heart disease, and diseases associated with pregnancy. The recorded decline in diarrhoea and enteritis, probably much smaller than the actual decline, accounts, by itself, for one-third of the total reduction in infant mortality as well as contributing very considerably to the decline in the pre-school age group. The decline in communicable diseases, particularly diphtheria, accounts for more than one-third of the whole decline in the 1-4 age group, for nearly one-half of that in the 5-9 age group, and for a significant part of the declines in infancy and in the 10-14 age group. The decline in tuberculosis, in itself, accounts for more than one-half of the reduction in mortality in the 15-19 and 20-29 age group and more than one-third of the whole decline in the 30-39 and 40-49 age groups, as well as contributing very materially to the declines in younger ages. The decline in typhoid fever accounts for approximately one-tenth of the whole decline in the age groups 15-49, with benefit extending to younger and older ages. The declines in respiratory disease, appendicitis and peritonitis, rheumatic heart disease, and diseases associated with pregnancy have added substantially to the total declines in various age groups and indicate a downward trend in these conditions. Gains in diabetes and pernicious anaemia have undoubtedly contributed to declines, but the rates for the former are small in comparison with the rates of the causes outlined and those recorded for pernicious anaemia are not considered sufficiently reliable to be used as a basis for comparison.

It is perhaps noteworthy that there is no certain evidence of slackening of any of the rates of decline during the depression of the thirties, the war of 1914-1918, or that part (three and one-third years) of the 1939-1945 war covered in this review.

With these data at hand, the many factors which have been responsible for the reductions in untimely mortality in all age groups under 50 in Ontario since 1900 may be further considered.

I am, of course, greatly indebted to all the staff, past and present, of this department for calculating, compiling and arranging the data as shown.

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(1) McKinnon, N. E., *Canad. J. Pub. Health*, 1944, *35*: 481.
(2) Ross, Mary A., and McKinnon, N. E., *Canad. Pub. Health J.*, 1939, *30*: 171 and 239.

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THE ANNUAL MEETING

IN keeping with the Government's request for the limitation of meetings in order to reduce the demands on transportation facilities and hotel accommodation, the thirty-fourth annual meeting of the Association, scheduled for November 12th to 14th, has been postponed until next spring. It will be held in the Royal York Hotel, Toronto, on May 6th, 7th and 8th.

The Prime Minister has announced that the plans of the Government as relating to health and welfare, including national health insurance, will be introduced at the Dominion-Provincial Conference, which will be held in August preceding the session of Parliament. In view of this, it is particularly regretted that the Association's meeting has had to be postponed, as the sessions would have afforded an opportunity for the members to consider the Government's proposals and to make any recommendations. However, the members of the Executive Council, with representatives of the various Sections, will meet in Toronto on November 12th and 13th to receive the reports of committees and to discuss the program for the advancement of public health in Canada.

SCHOOL HEALTH SURVEY

INTEREST on the part of health and educational authorities in the health and well-being of school age children has developed piecemeal. Although a substantial amount of work has been done, the results have, in all too many instances, been more inferential than conclusive. In the development of programs acceptable to all concerned, it is essential that the validity of certain theories and the value of certain practices be established. With this in mind, the Canada-Newfoundland Education Association approached The Canadian Life Insurance Officers Association for financial support of a survey and research project which would adequately explore how best the health of school-age children can be maintained, having in mind the responsibility of the school authorities. The objective will be the improvement of teaching techniques, of school health facilities, and of school health services, and the better co-ordination of home, school, and other community agencies responsible for the physical and mental health of young people. An exploratory survey will be undertaken to determine the nature of the subsequent investigations.

The Canadian Life Insurance Officers Association suggested that, in any

study of this kind, the Canadian Public Health Association should actively participate. This was endorsed wholeheartedly by the Canada-Newfoundland Education Association, and a joint committee has been set up. A grant of $10,000 for the year 1945-46 has been generously placed at the disposal of the committee by The Canadian Life Insurance Officers Association.

MORTALITY REDUCTIONS IN ONTARIO

THE REVIEW of mortality reductions in Ontario, continued in this issue, shows that the striking declines in mortality in all age groups under fifty years in Ontario from 1900 to 1942 are accounted for, in the main, according to the Registrar General's Reports of Vital Statistics, by declines in a few specific causes. In the early years of the period reviewed, however, these causes were the chief causes of death in the various age groups, and it is perhaps surprising to find that, in spite of the reductions recorded, they still stand, with some notable exceptions, high in the list. The conspicuous exceptions are diphtheria and tuberculosis. Forty-three years ago, and for a considerable time before and since that date, diphtheria ranked as first cause of death in childhood after the hazards of infancy were passed; the rates in 1942 showed it reduced almost to elimination. In the early years of the period surveyed, typhoid ranked high as a cause of death in the 15-49 age groups, with its toll extending to younger and older ages; in 1942 the rates had fallen nearly to zero. Tuberculosis, however, presents a somewhat different picture. In 1900 it stood in first place as a cause of death in the second, third, fourth and fifth decades of life and accounted for more than one in four of all deaths in those age groups, with its ravages extending also to younger and older ages. In the forty-three year period the tuberculosis death rates show a striking reduction, amounting to approximately four-fifths of the rate in 1900 and, in itself, accounting for nearly one-half of all the decline in mortality from adolescence to the fifth decade. In spite of such declines, however, tuberculosis still ranks as one of the chief causes of death in these age groups. So too, diarrhoea and enteritis, in spite of a decline from 37.3 per 1000 to 3, still constitutes one of the chief causes of a much lower infant mortality, the total having fallen from 136.4 to 40.1 per 1000 live births. In an earlier review by Dr. Mary A. Ross (1) covering the period of 1880 to 1931 it was shown that there had been "no decline in mortality from respiratory disease including influenza in any age group or in either sex in this 52 years"; in the present survey, the later rates since 1936 show precipitate declines of very considerable extent. It is to be hoped that these declines can be maintained and increased. Precipitate declines have occurred too in appendicitis mortality; these coincide to some extent with the declines in respiratory mortality and may be related as to cause. This is true also of the declines in mortality associated with pregnancy. The declines in the death rate of rheumatic heart disease, measles, whooping cough, and scarlet fever will bear much further study.

The presentation of mortality data through the medium of age-specific rates, as in this review, has definite advantages. Age-specific rates reflect much more clearly the state of the public health in so far as mortality is concerned than do general mortality rates of a population. In fact, general mortality rates may fail utterly to reflect vast differences. When near the order of our mortality of

today, they do not even suggest the most important consideration—the age at which death occurs. For instance, if all our deaths today occurred in old age, if few or no deaths occurred before old age, the state of health would be vastly different; medicine, including public health, would have achieved its highest objective as far as mortality is concerned; but the general mortality rate would not be materially different. Indeed, there are many points in these age-specific rates that provide food for thought through comparisons and contrasts within themselves and with data of other places. In this connection it is of great interest that the analysis of mortality (2) in the United States from 1900 to 1940, by the United States Bureau of the Census—and, too, the volume, *Twenty-five Years of Health Progress* (3), by Dublin and Lotka—show mortality declines very similar to those recorded in this review.

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1. Ross, Mary A.: Mortality from Respiratory Diseases excluding Tuberculosis, Ontario, 1880-1931. Canad. Pub. Health J., 1935, *26*: 552.
2. Linder, Forrest E., and Grove, Robert D.: Vital Statistics Rates in the United States, 1900-1940. Washington: United States Government Printing Office, 1943.
3. Dublin, Louis I., and Lotka, Alfred J.: Twenty-Five Years of Health Progress. New York: Metropolitan Life Insurance Company, 1937.

PROVISION FOR THE TRAINING OF PUBLIC HEALTH WORKERS IN THE SCHOOL OF HYGIENE, UNIVERSITY OF TORONTO

THE plans of Provincial Departments of Health for the provision of full-time local health services call for several hundred physicians with post-graduate training in public health and a large number of public health nurses. In addition, the programs will require dentists and engineers with public health training and veterinarians qualified in public health. For many years the School of Hygiene, University of Toronto, which was established with the generous assistance of The Rockefeller Foundation to serve as a Canadian centre for post-graduate training in public health, has provided courses leading to the Diploma in Public Health, for physicians, and to the degree of Master of Applied Science, for graduates in engineering. Last year, courses leading to the Diploma in Dental Public Health, the Diploma in Veterinary Public Health, and the Certificate in Public Health for graduates in arts and science who desire to qualify for work in certain special fields, were introduced. Additional lecture-room accommodation and laboratory facilities are now being provided in the School so that the enrolment in the course for the Diploma in Public Health may be increased to forty-two. The 1945-46 session will open on September 24th. In order that the training of returning Service personnel may be expedited, a second course will be offered beginning April 1, 1946, if a sufficient number are registered by February 1st. In this way post-graduate training can be provided for eighty-four physicians during the two sessions.

While provision for post-graduate training is made in the re-establishment plans for members of the Services, some physicians with family and other responsibilities may require additional financial assistance. Arrangements are therefore being made by the Departments of Health of several Provinces to supplement the grants for ex-Service personnel on the understanding that they will be available for appointments in those departments on the completion of their training.

Abstracts

Laboratory Criteria of the Cure of Typhoid Carriers

In order to assess accurately the worth of any method employed for the cure of typhoid carriers it is necessary that certain criteria should be fulfilled. As applied to cholecystectomy, it should be shown that the cases studied are permanent carriers, that they are gall-bladder carriers, and that the cure is permanent. Permanence of the carrier state may be regarded as established when persistently positive stool cultures are obtained for one year prior to operation or when a history of typhoid fever or of having caused a case 12 months or more prior to operation is given. To establish a gall-bladder carrier it is necessary to demonstrate typhoid bacilli in the bile obtained by duodenal drainage prior to operation or by culture from the gall-bladder at the time of operation. Cure of a carrier should be accepted only after 12 monthly negative stool samples followed by at least 1 negative bile sample have been demonstrated.

In Massachusetts where 68 carriers have undergone cholecystectomy it is shown on the basis of these criteria that at least 89.4 and probably 92.6 per cent were cured. Medical treatment of the carrier state, including sulfonamide therapy, has proved almost universally unavailing.

Roy F. Feemster and Helen M. Smith, Am. J. Pub. Health, 1945, 35: *368.*

An Outbreak of Hepatitis in a Diabetic Clinic

Over a two-year period 63 cases of hepatitis occurred among approximately 450 patients attending a diabetic clinic. There were 4 deaths and 6 cases with residual liver damage, all of the latter and all but one of the deaths occurring in patients over 55 years of age. Age as well as diabetes appeared to be a factor in this unusual severity. The prodromal symptoms of the patients are described, the clinical features tabulated in order of frequency and the course and complications discussed.

Epidemiologically it appeared that spread of the icterogenic agent occurred both by direct contact and by syringe transmission. There were at least 2 cases who did not attend the diabetic clinic, but came down with the disease after close contact with cases. Definite overcrowding at the clinic provided ample opportunity for contact spread. On the other hand, a single unsterilized syringe was used for taking blood samples but with a fresh boiled needle for each patient. As it has been shown that some blood is sucked back into a vein from the needle or syringe when a tourniquet is released, there were opportunities for parenteral inoculation of icterogenic serum. In about a third of the cases the incubation period suggested this latter route of infection. In a smaller number it was more typical of that found in contact spread.

Hugo Droller, Brit. M. J., 1945, May 5, p. 623.

An Outbreak of Water-borne Typhoid Investigated by Bacteriophage Typing and 'Selective' Sewage Examination

This account of water-borne typhoid and its investigation by bacteriophage typing makes a most interesting and illuminating story. A boy contracted typhoid after drinking water from a polluted stream and the organism when isolated from his stools was phage type C. Typhoid bacilli of the same type were isolated from the stream from which the boy drank and into which was discharged the sewage effluent from a large institution situated about 1 mile above the point where the boy drank. The same phage type of typhoid bacilli was isolated from the crude sewage and sewage effluent of the institution. This led to the discovery in the institution of 11 female typhoid carriers and 1 female carrier of *Bact. paratyphosum B.* Of the typhoid carriers, 4 were phage type A and 7 type C. A nurse on one of the "carrier wards" developed typhoid fever about a week after the boy, and type C organisms were isolated. Her sister had had typhoid fever some months previously and it would have appeared that she was the source of the nurse's infection or that there was a common source for the two except that the organisms were type E1 in this case.

Also of interest is the description of the bacteriological methods used for the isolation of the organisms from the various sources.

P. G. H. Gell, Betty C. Hobbs, and V. D. Allison, J. Hyg., 1945, 44: *120.*

Seroprophylaxis in Experimental Rabies

In this study of protection against rabies, groups of guinea-pigs, mice and monkeys were treated with concentrated rabies immune rabbit serum, or vaccine or both, at intervals after infection and the results compared with those from similar-sized unprotected groups serving as controls. It was demonstrated that the immune serum gave consistently better prophylaxis than vaccine alone. Protection was apparent when the serum was given up to 3 days after infection and was more effective when given intramuscularly at the site of virus inoculation than when given subcutaneously elsewhere in the body. For street virus infection better results were obtained when the serum prophylaxis was used in conjunction with vaccine. Protection was increased in this latter case when an interval of 6 days between serum administration and the beginning of the vaccine course was employed.

It is suggested that the use of such serum alone or followed at a suitable interval by a course of vaccine would appear to offer hope of improvement in prophylaxis in humans. The serum prolongs the incubation period and this would be a definite advantage in the more serious cases of exposure. In addition to the above advantage, administration of serum in the area of a bite, where possible, would amount to local specific treatment. Finally, the interval between serum and vaccine administration would allow time, in many instances, for laboratory examination to be made and where the result was negative use of the vaccine could be avoided.

Earl Habel, U.S. Pub. Health Rep., 1945, 60: *545.*

Typing of Staphylococci by the Bacteriophage Method

A method for the identification of types of staphylococci represents significant progress and is of great interest in view of the difficulties in the past. The method of bacteriophage typing described in this paper resembles that already well established for the typing of typhoid bacilli.

The authors describe the procedure by which they obtained the phage strains and the method of setting up the tests and present their results along with examples of epidemiological application.

In all, 1340 strains of *Staphylococcus aureus* were studied and 21 types or subtypes were identified. These strains were isolated from the usual sources—nose, skin, abscesses, wounds, burns and a few from food or food-poisoning sufferers. The last 460 strains were thoroughly examined and of these 60.4 per cent were successfully typed, 22.6 per cent were acted on by phage but were not clearcut as to type and 17 per cent were insusceptible to the phages in use. Only 2 of the types comprised more than 10 per cent of all the strains.

By means of this phage-typing the source of 2 food poisoning and pemphigus outbreaks was determined. The epidemiology of staphylococcal infections thus becomes much more exact and clearcut, as was the case in typhoid fever after the introduction of phage-typing.

G. S. Wilson and J. D. Atkinson, The Lancet, 1945, 1: *647.*

News

British Columbia

In the summer of 1944, a Joint Committee on the Study of Health Insurance was formed in British Columbia. This committee was established on the suggestion of the Committee on Economics of the British Columbia Medical Association, and consisted of five representatives from each of the following organizations: The British Columbia Hospitals Association, The British Columbia Dental Association, The Pharmaceutical Association of British Columbia, The Registered Nurses' Association of British Columbia, and the British Columbia Medical Association. The chairman was Dr. S. G. Baldwin.

The purpose of the committee was to study and discuss health insurance, with particular reference to professional participation, and with the desire that the highest possible standards of health services might be provided.

Eight meetings were held during the fall,

winter, and spring months of 1944-45. At the opening meeting the discussion was led by Dr. H. McPhedran, President, and Dr. T. C. Routley, General Secretary, of the Canadian Medical Association. Each organization presented material for discussion. The round-table discussion of individual and mutual problems has led to a greater appreciation of the difficulties to be encountered and there is no doubt that the inception of health insurance will be facilitated in British Columbia because of the open discussion and appreciation of each other's problems. In no wise do the transactions and recommendations of the committee reflect the official approval of parent bodies. However, the report of the committee will be forwarded to parent bodies for further action. It is gratifying that the integration and expansion of both curative and preventive services was emphasized.

It is the desire of the committee to continue this fall and the suggestion has been made that lay groups such as labour, women's organizations, etc., be invited to send representatives to bring the discussions to a community level.

It is not known whether such discussion groups have been active in other provinces. However, the suggestion is passed along with the hope that similar groups across Canada might benefit because of our experience and that health insurance, when it comes, will receive a more understanding reception.—J. S. KITCHING.

Manitoba

THE Bureau of Public Health Nursing announces that there are fourteen vacancies or new positions to be filled during the summer. Five public health nurses are returning to the staff from post-graduate courses, four of them from Toronto and one from Columbia University. Six public health nurses will take post-graduate courses in public health during the coming term at the Universities of Manitoba, Toronto, Columbia, and Minnesota.

DR. F. W. JACKSON, Deputy Minister of Health and Public Welfare, was Manitoba's representative at two conferences in Ottawa. These were the regular semi-annual meeting of the Dominion Council of Health, held on May 28th and 29th; and a meeting of the Advisory Committee to the Indian Affairs Branch of the Dominion Department of Mines and Resources, held on May 30th and 31st, at which time the control of tuberculosis among Canadian Indians was discussed.

THE ANNUAL silicosis survey of Manitoba miners was carried out during the month of June by Dr. H. M. Malcolmson, Director of the Bureau of Industrial Hygiene, and Mr. W. Allison, X-ray technician with the Department of Health and Public Welfare. The mines covered were the Sherrit-Gordon Mines at Sherridon, and the San Antonio Mines at Bissett.

DR. C. E. MATHER, Director of the Bureau of Local Health Services, has resigned from the Department to join the medical service of the Canadian National Railways. Dr. Mather had been with the Department for three years. His successor has not yet been announced.

STEPS are being taken leading to the introduction of the Manitoba Health Plan in the rural areas. The Minister and other members of the Department of Health and Public Welfare have already visited about fifteen centres in the province to discuss plans for hospitalization and for full-time health units. Essential to the Plan is public understanding and local initiative. A 40-page booklet giving complete details has been issued, and a series of popular pictorial leaflets is planned. The first, entitled "Health Services for Your Community," is already being widely distributed.

THE SCHOOL of Nursing Education, University of Manitoba, sponsored an Institute of Family Health Counselling from June 18th to 22nd. The Institute was under the leadership of Miss Francis Benjamin, Parent Education Consultant, Michigan Department of Health, and was for the benefit of anyone "professionally concerned with the promotion of wholesome family adjustments."

DR. F. T. CADHAM, Director of Laboratories, Provincial Department of Health and Public Welfare, attended an important meeting of the directors of the public health laboratories in Canada which was held in Ottawa on May 21st and 22nd.